



IFWO

RAW SEQUENCE LISTING

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:49

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

1 <110> APPLICANT: DeBonte, Lorin R.
 2 Fan, Zhegong
 3 Miao, Guo-Hua
 4 <120> TITLE OF INVENTION: FATTY ACID DESATURASES AND MUTANT SEQUENCES THEREOF
 5 <130> FILE REFERENCE: 07148-063003
 6 <140> CURRENT APPLICATION NUMBER: US/10/757,909
 7 <141> CURRENT FILING DATE: 2004-01-15
 8 <150> PRIOR APPLICATION NUMBER: US/09/771,904
 9 <151> PRIOR FILING DATE: 2001-01-29
 10 <150> PRIOR APPLICATION NUMBER: US 08/874,109
 11 <151> PRIOR FILING DATE: 1997-06-12
 12 <160> NUMBER OF SEQ ID NOS: 70
 13 <170> SOFTWARE: FastSEQ for Windows Version 4.0
 15 <210> SEQ ID NO: 1
 16 <211> LENGTH: 1155
 17 <212> TYPE: DNA
 18 <213> ORGANISM: Brassica napus
 19 <220> FEATURE:
 20 <221> NAME/KEY: CDS
 21 <222> LOCATION: (1)...(1152)
 22 <223> OTHER INFORMATION: Wild type Fad2
 23 <220> FEATURE:
 24 <221> NAME/KEY: misc_feature
 25 <222> LOCATION: 205
 26 <223> OTHER INFORMATION: n = a, g, c, or t/u
 27 <400> SEQUENCE: 1
 28 atg ggt gca ggt gga aga atg caa gtg tct cct ccc tcc aag aag tct 48
 29 Met Gly Ala Gly Gly Arg Met Gln Val Ser Pro Pro Ser Lys Lys Ser
 30 1 5 10 15
 31 gaa acc gac acc atc aag cgc gta ccc tgc gag aca ccg ccc ttc act 96
 32 Glu Thr Asp Thr Ile Lys Arg Val Pro Cys Glu Thr Pro Pro Phe Thr
 33 20 25 30
 34 gtc gga gaa ctc aag aaa gca atc cca ccg cac tgt ttc aaa cgc tcg 144
 35 Val Gly Glu Leu Lys Lys Ala Ile Pro Pro His Cys Phe Lys Arg Ser
 36 35 40 45
 37 atc cct cgc tct ttc tcc tac ctc atc tgg gac atc atc ata gcc tcc 192
 38 Ile Pro Arg Ser Phe Ser Tyr Leu Ile Trp Asp Ile Ile Ile Ala Ser
 39 50 55 60
 W--> 40 tgc ttc tac tac ntc gcc acc act tac ttc cct ctc ctc cct cac cct 240
 W--> 41 Cys Phe Tyr Tyr Xaa Ala Thr Thr Tyr Phe Pro Leu Leu Pro His Pro
 42 65 70 75 80
 43 ctc tcc tac ttc gcc tgg cct ctc tac tgg gcc tgc caa ggg tgc gtc 288
 44 Leu Ser Tyr Phe Ala Trp Pro Leu Tyr Trp Ala Cys Gln Gly Cys Val

ENTERED

RAW SEQUENCE LISTING

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:49

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

45		85	90	95	
46	cta acc ggc gtc tgg gtc ata gcc cac gaa tgc ggc cac cac gcc ttc	336			
47	Leu Thr Gly Val Trp Val Ile Ala His Glu Cys Gly His His Ala Phe				
48	100 105 110				
49	agc gac tac cag tgg ctt gac gac acc gtc ggt ctc atc ttc cac tcc	384			
50	Ser Asp Tyr Gln Trp Leu Asp Asp Thr Val Gly Leu Ile Phe His Ser				
51	115 120 125				
52	ttc ctc ctc gtc cct tac ttc tcc tgg aag tac agt cat cgc agc cac	432			
53	Phe Leu Leu Val Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Ser His				
54	130 135 140				
55	cat tcc aac act ggc tcc ctc gag aga gac gaa gtg ttt gtc ccc aag	480			
56	His Ser Asn Thr Gly Ser Leu Glu Arg Asp Glu Val Phe Val Pro Lys				
57	145 150 155 160				
58	aag aag tca gac atc aag tgg tac ggc aag tac ctc aac aac cct ttg	528			
59	Lys Lys Ser Asp Ile Lys Trp Tyr Gly Lys Tyr Leu Asn Asn Pro Leu				
60	165 170 175				
61	gga cgc acc gtg atg tta acg gtt cag ttc act ctc ggc tgg ccg ttg	576			
62	Gly Arg Thr Val Met Leu Thr Val Gln Phe Thr Leu Gly Trp Pro Leu				
63	180 185 190				
64	tac tta gcc ttc aac gtc tcg gga aga cct tac gac ggc ggc ttc cgt	624			
65	Tyr Leu Ala Phe Asn Val Ser Gly Arg Pro Tyr Asp Gly Gly Phe Arg				
66	195 200 205				
67	tgc cat ttc cac ccc aac gct ccc atc tac aac gac cgc gag cgt ctc	672			
68	Cys His Phe His Pro Asn Ala Pro Ile Tyr Asn Asp Arg Glu Arg Leu				
69	210 215 220				
70	cag ata tac atc tcc gac gct ggc atc ctc gcc gtc tgc tac ggt ctc	720			
71	Gln Ile Tyr Ile Ser Asp Ala Gly Ile Leu Ala Val Cys Tyr Gly Leu				
72	225 230 235 240				
73	ttc cgt tac gcc gcc ggc cag gga gtg gcc tcg atg gtc tgc ttc tac	768			
74	Phe Arg Tyr Ala Ala Gly Gln Gly Val Ala Ser Met Val Cys Phe Tyr				
75	245 250 255				
76	gga gtc ccg ctt ctg att gtc aat ggt ttc ctc gtg ttg atc act tac	816			
77	Gly Val Pro Leu Leu Ile Val Asn Gly Phe Leu Val Leu Ile Thr Tyr				
78	260 265 270				
79	ttg cag cac acg cat cct tcc ctg cct cac tac gat tcg tcc gag tgg	864			
80	Leu Gln His Thr His Pro Ser Leu Pro His Tyr Asp Ser Ser Glu Trp				
81	275 280 285				
82	gat tgg ttc agg gga gct ttg gct acc gtt gac aga gac tac gga atc	912			
83	Asp Trp Phe Arg Gly Ala Leu Ala Thr Val Asp Arg Asp Tyr Gly Ile				
84	290 295 300				
85	ttg aac aag gtc ttc cac aat att acc gac acg cac gtg gcc cat cat	960			
86	Leu Asn Lys Val Phe His Asn Ile Thr Asp Thr His Val Ala His His				
87	305 310 315 320				
88	ccg ttc tcc acg atg ccg cat tat cac gcg atg gaa gct acc aag gcg	1008			
89	Pro Phe Ser Thr Met Pro His Tyr His Ala Met Glu Ala Thr Lys Ala				
90	325 330 335				
91	ata aag ccg ata ctg gga gag tat tat cag ttc gat ggg acg ccg gtg	1056			
92	Ile Lys Pro Ile Leu Gly Glu Tyr Tyr Gln Phe Asp Gly Thr Pro Val				
93	340 345 350				

RAW SEQUENCE LISTING

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:49

Input Set : N:\Crif3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

```

94      gtt aag gcg atg tgg agg gag gcg aag gag tgt atc tat gtg gaa ccg      1104
95      Val Lys Ala Met Trp Arg Glu Ala Lys Glu Cys Ile Tyr Val Glu Pro
96              355                      360                      365
97      gac agg caa ggt gag aag aaa ggt gtg ttc tgg tac aac aat aag tta      1152
98      Asp Arg Gln Gly Glu Lys Lys Gly Val Phe Trp Tyr Asn Asn Lys Leu
99              370                      375                      380
100      tga      1155
102 <210> SEQ ID NO: 2
103 <211> LENGTH: 384
104 <212> TYPE: PRT
105 <213> ORGANISM: Brassica napus
106 <220> FEATURE:
107 <223> OTHER INFORMATION: Xaa = Phe, Leu, Ile, or Val
108 <400> SEQUENCE: 2
109      Met Gly Ala Gly Gly Arg Met Gln Val Ser Pro Pro Ser Lys Lys Ser
110              1              5              10              15
111      Glu Thr Asp Thr Ile Lys Arg Val Pro Cys Glu Thr Pro Pro Phe Thr
112              20              25              30
113      Val Gly Glu Leu Lys Lys Ala Ile Pro Pro His Cys Phe Lys Arg Ser
114              35              40              45
115      Ile Pro Arg Ser Phe Ser Tyr Leu Ile Trp Asp Ile Ile Ile Ala Ser
116              50              55              60
W--> 117      Cys Phe Tyr Tyr Xaa Ala Thr Thr Tyr Phe Pro Leu Leu Pro His Pro
118              65              70              75              80
119      Leu Ser Tyr Phe Ala Trp Pro Leu Tyr Trp Ala Cys Gln Gly Cys Val
120              85              90              95
121      Leu Thr Gly Val Trp Val Ile Ala His Glu Cys Gly His His Ala Phe
122              100             105             110
123      Ser Asp Tyr Gln Trp Leu Asp Asp Thr Val Gly Leu Ile Phe His Ser
124              115             120             125
125      Phe Leu Leu Val Pro Tyr Phe Ser Trp Lys Tyr Ser His Arg Ser His
126              130             135             140
127      His Ser Asn Thr Gly Ser Leu Glu Arg Asp Glu Val Phe Val Pro Lys
128              145             150             155             160
129      Lys Lys Ser Asp Ile Lys Trp Tyr Gly Lys Tyr Leu Asn Asn Pro Leu
130              165             170             175
131      Gly Arg Thr Val Met Leu Thr Val Gln Phe Thr Leu Gly Trp Pro Leu
132              180             185             190
133      Tyr Leu Ala Phe Asn Val Ser Gly Arg Pro Tyr Asp Gly Gly Phe Arg
134              195             200             205
135      Cys His Phe His Pro Asn Ala Pro Ile Tyr Asn Asp Arg Glu Arg Leu
136              210             215             220
137      Gln Ile Tyr Ile Ser Asp Ala Gly Ile Leu Ala Val Cys Tyr Gly Leu
138              225             230             235             240
139      Phe Arg Tyr Ala Ala Gly Gln Gly Val Ala Ser Met Val Cys Phe Tyr
140              245             250             255
141      Gly Val Pro Leu Leu Ile Val Asn Gly Phe Leu Val Leu Ile Thr Tyr
142              260             265             270
143      Leu Gln His Thr His Pro Ser Leu Pro His Tyr Asp Ser Ser Glu Trp

```

RAW SEQUENCE LISTING

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:49

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

```

144          275          280          285
145  Asp Trp Phe Arg Gly Ala Leu Ala Thr Val Asp Arg Asp Tyr Gly Ile
146          290          295          300
147  Leu Asn Lys Val Phe His Asn Ile Thr Asp Thr His Val Ala His His
148          305          310          315          320
149  Pro Phe Ser Thr Met Pro His Tyr His Ala Met Glu Ala Thr Lys Ala
150          325          330          335
151  Ile Lys Pro Ile Leu Gly Glu Tyr Tyr Gln Phe Asp Gly Thr Pro Val
152          340          345          350
153  Val Lys Ala Met Trp Arg Glu Ala Lys Glu Cys Ile Tyr Val Glu Pro
154          355          360          365
155  Asp Arg Gln Gly Glu Lys Lys Gly Val Phe Trp Tyr Asn Asn Lys Leu
156          370          375          380
158 <210> SEQ ID NO: 3
159 <211> LENGTH: 1155
160 <212> TYPE: DNA
161 <213> ORGANISM: Brassica napus
162 <220> FEATURE:
163 <221> NAME/KEY: CDS
164 <222> LOCATION: (1)...(1152)
165 <223> OTHER INFORMATION: G to A transversion mutation at nucleotide 316
166 <220> FEATURE:
167 <221> NAME/KEY: misc_feature
168 <222> LOCATION: 205
169 <223> OTHER INFORMATION: n = a, g, c, or t/u
170 <400> SEQUENCE: 3
171  atg ggt gca ggt gga aga atg caa gtg tct cct ccc tcc aag aag tct      48
172  Met Gly Ala Gly Gly Arg Met Gln Val Ser Pro Pro Ser Lys Lys Ser
173    1          5          10          15
174  gaa acc gac acc atc aag cgc gta ccc tgc gag aca ccg ccc ttc act      96
175  Glu Thr Asp Thr Ile Lys Arg Val Pro Cys Glu Thr Pro Pro Phe Thr
176          20          25          30
177  gtc gga gaa ctc aag aaa gca atc cca ccg cac tgt ttc aaa cgc tcg      144
178  Val Gly Glu Leu Lys Lys Ala Ile Pro Pro His Cys Phe Lys Arg Ser
179          35          40          45
180  atc cct cgc tct ttc tcc tac ctc atc tgg gac atc atc ata gcc tcc      192
181  Ile Pro Arg Ser Phe Ser Tyr Leu Ile Trp Asp Ile Ile Ile Ala Ser
182          50          55          60
-> 183  tgc ttc tac tac ntc gcc acc act tac ttc cct ctc ctc cct cac cct      240
-> 184  Cys Phe Tyr Tyr Xaa Ala Thr Thr Tyr Phe Pro Leu Leu Pro His Pro
185          65          70          75          80
186  ctc tcc tac ttc gcc tgg cct ctc tac tgg gcc tgc caa ggg tgc gtc      288
187  Leu Ser Tyr Phe Ala Trp Pro Leu Tyr Trp Ala Cys Gln Gly Cys Val
188          85          90          95
189  cta acc ggc gtc tgg gtc ata gcc cac aag tgc ggc cac cac gcc ttc      336
190  Leu Thr Gly Val Trp Val Ile Ala His Lys Cys Gly His His Ala Phe
191          100          105          110
192  agc gac tac cag tgg ctt gac gac acc gtc ggt ctc atc ttc cac tcc      384
193  Ser Asp Tyr Gln Trp Leu Asp Asp Thr Val Gly Leu Ile Phe His Ser

```

DATE: 08/31/2004

TIME: 13:36:49

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

	115					120					125						
194	ttc	ctc	ctc	gtc	cct	tac	ttc	tcc	tgg	aag	tac	agt	cat	cgc	agc	cac	432
195	Phe	Leu	Leu	Val	Pro	Tyr	Phe	Ser	Trp	Lys	Tyr	Ser	His	Arg	Ser	His	
196		130					135					140					
197	cat	tcc	aac	act	ggc	tcc	ctc	gag	aga	gac	gaa	gtg	ttt	gtc	ccc	aag	480
198	His	Ser	Asn	Thr	Gly	Ser	Leu	Glu	Arg	Asp	Glu	Val	Phe	Val	Pro	Lys	
199	145					150					155					160	
200	aag	aag	tca	gac	atc	aag	tgg	tac	ggc	aag	tac	ctc	aac	aac	cct	ttg	528
201	Lys	Lys	Ser	Asp	Ile	Lys	Trp	Tyr	Gly	Lys	Tyr	Leu	Asn	Asn	Pro	Leu	
202					165					170					175		
203	gga	cgc	acc	gtg	atg	tta	acg	gtt	cag	ttc	act	ctc	ggc	tgg	ccg	ttg	576
204	Gly	Arg	Thr	Val	Met	Leu	Thr	Val	Gln	Phe	Thr	Leu	Gly	Trp	Pro	Leu	
205			180					185						190			
206	tac	tta	gcc	ttc	aac	gtc	tcg	gga	aga	cct	tac	gac	ggc	ggc	ttc	cgt	624
207	Tyr	Leu	Ala	Phe	Asn	Val	Ser	Gly	Arg	Pro	Tyr	Asp	Gly	Gly	Phe	Arg	
208			195				200					205					
209	tgc	cat	ttc	cac	ccc	aac	gct	ccc	atc	tac	aac	gac	cgc	gag	cgt	ctc	672
210	Cys	His	Phe	His	Pro	Asn	Ala	Pro	Ile	Tyr	Asn	Asp	Arg	Glu	Arg	Leu	
211		210					215					220					
212	cag	ata	tac	atc	tcc	gac	gct	ggc	atc	ctc	gcc	gtc	tgc	tac	ggg	ctc	720
213	Gln	Ile	Tyr	Ile	Ser	Asp	Ala	Gly	Ile	Leu	Ala	Val	Cys	Tyr	Gly	Leu	
214	225					230					235					240	
215	ttc	cgt	tac	gcc	gcc	ggc	cag	gga	gtg	gcc	tcg	atg	gtc	tgc	ttc	tac	768
216	Phe	Arg	Tyr	Ala	Ala	Gly	Gln	Gly	Val	Ala	Ser	Met	Val	Cys	Phe	Tyr	
217					245					250					255		
218	gga	gtc	ccg	ctt	ctg	att	gtc	aat	ggg	ttc	ctc	gtg	ttg	atc	act	tac	816
219	Gly	Val	Pro	Leu	Leu	Ile	Val	Asn	Gly	Phe	Leu	Val	Leu	Ile	Thr	Tyr	
220				260				265					270				
221	ttg	cag	cac	acg	cat	cct	tcc	ctg	cct	cac	tac	gat	tcg	tcc	gag	tgg	864
222	Leu	Gln	His	Thr	His	Pro	Ser	Leu	Pro	His	Tyr	Asp	Ser	Ser	Glu	Trp	
223		275					280					285					
224	gat	tgg	ttc	agg	gga	gct	ttg	gct	acc	gtt	gac	aga	gac	tac	gga	atc	912
225	Asp	Trp	Phe	Arg	Gly	Ala	Leu	Ala	Thr	Val	Asp	Arg	Asp	Tyr	Gly	Ile	
226		290				295					300						
227	ttg	aac	aag	gtc	ttc	cac	aat	att	acc	gac	acg	cac	gtg	gcc	cat	cat	960
228	Leu	Asn	Lys	Val	Phe	His	Asn	Ile	Thr	Asp	Thr	His	Val	Ala	His	His	
229	305					310											

RAW SEQUENCE LISTING ERROR SUMMARY

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:50

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:1; N Pos. 205

Seq#:1; Xaa Pos. 69

Seq#:2; Xaa Pos. 69

Seq#:3; N Pos. 205

Seq#:3; Xaa Pos. 69

Seq#:4; Xaa Pos. 69

VARIABLE LOCATION SUMMARY

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:50

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

Use of n's or Xaa's (NEW RULES):

Use of n's and/or Xaa's have been detected in the Sequence Listing.

Use of <220> to <223> is MANDATORY if n's or Xaa's are present.

in <220> to <223> section, please explain location of n or Xaa, and which residue n or Xaa represents.

Seq#:1; N Pos. 205

Seq#:1; Xaa Pos. 69

Seq#:2; Xaa Pos. 69

Seq#:3; N Pos. 205

Seq#:3; Xaa Pos. 69

Seq#:4; Xaa Pos. 69

VERIFICATION SUMMARY

DATE: 08/31/2004

PATENT APPLICATION: US/10/757,909

TIME: 13:36:50

Input Set : N:\Crf3\RULE60\10757909.raw.txt

Output Set: N:\CRF4\08312004\J757909.raw

L:40 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:192
L:41 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:240
L:117 M:258 W: Mandatory Feature missing, <221> Tag not found for SEQ ID#:2
L:117 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:2
L:117 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2 after pos.:64
L:183 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:192
L:184 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:240
L:260 M:258 W: Mandatory Feature missing, <221> Tag not found for SEQ ID#:4
L:260 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:4
L:260 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:64